



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,262	10/21/2003	Satoshi Itoh	4041J-000791	3416
27572	7590	01/25/2006	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			MCCRAW, BARRY CLAYTON	
			ART UNIT	PAPER NUMBER

3744

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/690,262	ITOH ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	B. Clayton McCraw	3744	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6 and 11 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 7-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/21/2003</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In lines 9-10, the phrase "either one of said first variable throttle valve and said second variable throttle valve is said first variable throttle valve" is unclear in meaning. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 3744

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. (US 6,035,653) in view of Iritani (US 5,701,753) in further view of Ishikawa et al. (US 6,314,750). Itoh et al. explicitly teach a vehicle air conditioning system comprising an air duct (2; Figure 1); a refrigeration cycle having a cooling heat exchanger (11), a heating heat exchanger (12), an external heat exchanger (22), a first variable throttle valve (24), a second variable throttle valve (23), a dehumidifying mode circulation path (20), a cycle efficiency sensing means (col. 4, lines 49-67; these sensors combined are capable of sensing cycle efficiency); a motor driven refrigerant compressor (21), activated by an inverter (31); a high pressure sensing means (41), providing a maximum cycle efficiency in accordance with the temperature of the refrigerant sensed (col. 6, lines 41-47), in accordance with pressure deviation (col. 6, lines 47-50); a blowing temperature determination means (45), a dehumidifying or defogging switch (55c), and a dehumidifying mode selection means (col. 5, lines 10-11). Itoh et al. do not explicitly teach calculating a target cycle efficiency or a means for controlling a throttle valve. Iritani explicitly teaches calculating a target cycle efficiency (col. 9, lines 42-45). Ishikawa et al. explicitly teach a means for controlling a throttle valve (col. 12, lines 52-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the vehicle air conditioning system of Itoh et al. with the efficiency calculation of Iritani with the valve control

Art Unit: 3744

means of Ishikawa et al. since maximizing efficiency is always advantageous in any given system and valve control is one of many possible ways of efficiency maximization.

7. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. (US 6,035,653) in view of Iritani (US 5,701,753) in further view of Ishikawa et al. (US 6,314,750) and in further view of Kuroda et al. (US 2002/0023451). Itoh et al., Iritani, and Ishikawa et al. explicitly teach the elements of the present invention as described above, but do not explicitly teach carbon dioxide as the refrigerant, or a supercritical vapor compressive heat pump cycle where the refrigerant is discharged from the compressor at a pressure greater than or equal to a critical pressure of the refrigerant. Kuroda et al. explicitly teach carbon dioxide as the refrigerant (paragraph 0030, lines 13-15), and a supercritical vapor compressive heat pump cycle where the refrigerant is discharged from the compressor at a pressure greater than or equal to a critical pressure of the refrigerant (paragraph 0030, lines 6-11). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the vehicle air conditioning system as taught by Itoh et al., Iritani, and Ishikawa et al. with the supercritical vapor compressive heat pump cycle as taught by Kuroda et al. since compressing carbon dioxide in a refrigeration to a point greater than or equal to its critical pressure is understood to increase efficiency of carbon dioxide systems and is common in the art.

***Allowable Subject Matter***

8. Claims 4, 5, and 7-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Levitin et al. (US 6,053,000) teach a refrigeration unit with an adjusting valve; Yamasaki et al. (US 2001/0027657) teach a pressure reducer and refrigerating cycle unit; Weng et al. (US 2002/0162342) teach a method for controlling an air conditioner; Lifson et al. (US 6,138,467) teach a refrigeration system reaching optimum capacity; and Schaeffer (US 6,272,870) teaches a refrigeration system with pressure regulating device.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. Clayton McCraw whose telephone number is (571) 272-3665. The examiner can normally be reached on M-F 8:30AM-5:00PM.


11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3744

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



BOM  
1/17/06



MARC NORMAN  
PRIMARY EXAMINER